



Geotechnical,  
Environmental  
and Construction  
Materials Engineers

CTI and Associates, Inc.

Corporate Office  
12482 Emerson Drive, Brighton, MI 48116  
248.486.5100 248.486.5050 Fax  
[www.cticompanies.com](http://www.cticompanies.com)

January 27, 2009

Mr. Juan Thomas  
USEPA Region 5  
DE-9J77 W. Jackson BLVD  
Chicago, IL 60604

*FORWARDED VIA EMAIL*

**RE: Semi-Annual Groundwater Monitoring Report (Fall 2008 Reporting Cycle)  
Former Stanley Tools Work Site (MID-099-124-299)**

Dear Mr. Thomas,

Please find the enclosed Semi-Annual Groundwater Monitoring Report for the Former Stanley Tool Works Site (MID-099-124-299), located in Fowlerville, Michigan.

If you have any questions concerning this attachment or questions during your review, please contact Raulie Casteel at 502.477.5020, or Drew Lonergan at 248.486.5100.

Respectfully,

**CTI and Associates, Inc.**

Raulie W. Casteel  
Senior Project Scientist

cc: Ms. Jennifer Bolger, Gonzalez, Saggio & Harlan LLP  
Mr. Luseni (Lou) Pieh, Gonzalez, Saggio & Harlan LLP  
Mr. Andrew Lonergan, CTI

Locations

Louisville, KY

Sandy Lake, PA

Cleveland, WI

Kansas City, MO

**Semi-Annual Groundwater Monitoring  
Report (Fall 2008 Reporting Cycle)**

**Former Stanley Tool Works**

**Fowlerville, Michigan**

**January 27, 2008**

**Prepared for**

**Gonzalez, Saggio & Harlan LLP  
225 East Michigan Avenue, 4th floor  
Milwaukee, WI 53202**

**Prepared by**

**CTI and Associates, Inc.  
12482 Emerson Drive  
Brighton, Michigan 48116**

**JCI Former Stanley Tool Works  
Semi-Annual Groundwater Monitoring Report  
Fall 2008 Reporting Cycle**

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## 1.0 INTRODUCTION

On behalf of Johnson Controls, Inc. (JCI), CTI and Associates, Inc. (CTI) has prepared the fall 2008 Semi-Annual Groundwater Monitoring Results Report for the JCI Former Stanley Tool Works Site (MID-099-124-299), located in Fowlerville, Michigan. The site location is shown on Figure 1. Groundwater monitoring activities are part of JCI's on-going RCRA Corrective Action obligations as documented in the US Environmental Protection Agency (EPA) *Final Decision and Response to Comments Selection of Remedial Alternative* for JCI, dated December 1, 2006. CTI conducts semi-annual groundwater monitoring at the Site in accordance with the following documents: 1) the Groundwater Monitoring Program Plan (GMPP) outlined in the EPA approved Corrective Measures Implementation Program (CMIP) Work Plan prepared by Entact & Associates, LLC (June 1, 2007); and 2) the Mixing Zone Compliance Monitoring Plan (Earth Tech, Inc., May 2006) submitted to the Michigan Department of Environmental Quality (MDEQ) as required by its Mixing Zone Determination Letter (February 23, 2006).

In a letter dated October 2, 2008, CTI requested a review by the U.S. EPA for a modification to the sampling and reporting schedules. The U.S. EPA approved the request in a letter dated October 16, 2008. The letter specifies the Annual "spring-time" sampling event will now be conducted by the end of the Second Calendar Quarter (between April and June each year). The Semi-Annual "fall-time" sampling event will be conducted between October and November each year. The reporting deadlines are 60 days following each respective sampling event.

CTI conducted field activities between November 11<sup>th</sup> and 13<sup>th</sup>, 2008. The objective of the field activities was to visually inspect each GMPP well, collect static water level data from all on-site and off-site wells, sample groundwater from the 19 viable GMPP wells and analyze each sample in accordance with the CMIP. The objective of the reporting activities was to summarize all field and analytical data and present the findings and conclusions from the evaluation.

This report includes a brief discussion of the well inspection and groundwater sampling methodologies, a discussion of the groundwater flow direction, a summary of the

groundwater analytical test results and an evaluation of the laboratory QA/QC protocol. Items appended to the report include Site figures, monitoring well sampling records and the complete package of laboratory analytical results.

## **2.0 GMPP WELL SAMPLING SUMMARY**

Between November 11<sup>th</sup> and the 13<sup>th</sup>, 2008, CTI field personnel collected water level readings, visually evaluated the exterior of 52 monitoring wells (located on-site and off-site), and collected groundwater samples from the 17 viable GMPP wells. Monitoring well sampling locations are presented on Figure 2. The completed Monitoring Well Inspection Checklist Forms are presented in Appendix A. MW-8 and MW-25 were not sampled due to the damaged condition of the protective steel covers and well pipes. As documented in the Well Abandonment and Replacement Work Plan, dated December 5, 2008, these wells need to be replaced, but cannot until the adjacent landowner, American Compounding Services (ACS) completes its planned construction to expand its facility. ACS is prepared to begin Phase II construction upon approval of the December 5, 2008 work plan. Construction is expected to last between six and eight months, followed by well replacement activities. Once well abandonment and replacement activities are conducted MW-8 and MW-25 will be included in the next sampling event. However, the resumption of GMPP sampling from replacement wells is contingent on ACS' construction schedule.

## **3.0 WATER LEVEL MEASUREMENTS / FLOW DIRECTION**

On November 11<sup>th</sup>, 2008, CTI field personnel collected water level measurements at 52 well locations, as identified on Table 1, *Groundwater Monitoring Well Systems Summary Table*. The flow direction in the site's shallow aquifer is consistent with historical data. Groundwater flows from the site and surrounding area to the Red Cedar River. A shallow aquifer piezometric map is provided as Figure 3.

#### **4.0 GROUNDWATER SAMPLE COLLECTION**

CTI field personnel utilized industry accepted water level meters, water quality instruments with attachable/detachable flow-through cells, (displays temperature, DO, pH, ORP, specific conductivity and turbidity) and peristaltic pump systems to complete the field objectives.

CTI personnel calibrated the peristaltic unit, at each well, by determining the maximum draw-down to achieve an EPA recommended 0.1 to 0.5 L/minute pumping rate. CTI field personnel documented the groundwater chemistry on monitoring well sampling records, as presented in Appendix A. None of the GMPP wells purged dry.

CTI sampled each well in accordance with the approved CMIP. Groundwater was sampled at seventeen monitoring wells for a combination of analytical parameters including volatile organic compounds (VOCs), 10 Michigan Metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver, copper and zinc), total and available cyanide, hexavalent chromium (+6), nickel, and/or monitored natural attenuation parameters (sulfates/sulfides, nitrates/nitrites, ferrous (+2) and ferric (+3) iron, alkalinity, manganese, chemical oxygen demand (COD), water hardness (as calcium carbonate) and ethane/ethene. The samples were securely packaged on ice, in coolers for transport.

Trimatrix Laboratories (Trimatrix) of Grand Rapids, Michigan supplied a courier pick-up service for transport to the laboratory. Sample transfer from CTI personnel to laboratory personnel was completed under proper chain of custody procedures. Laboratory analysis was completed by Trimatrix.

#### **5.0 LABORATORY ANALYTICAL RESULTS**

As presented above, CTI sampled a total of 17 well points for GMPP analytical parameters. The analytical data has been summarized in tabular format located in Tables 2 through 5. The analytical report is presented in Appendix B.

##### **Inorganic Results Summary**

Table 2 documents the concentrations of the total and dissolved metals reported for the respective samples. Groundwater laboratory analytical results were compared to the

MDEQ Final Acute Values (FAVs), Worst Case Maximum Site Concentration Values and Generic Groundwater-Surface Water Interface (GSI) Cleanup Criteria. The FAVs and Worst Case Maximum Site Concentration Values were taken from the MDEQ's Mixing Zone Determination Letter to USEPA, dated February 23, 2006.

The MDEQ Mixing Zone FAV and Worst Case Concentration Values are for free cyanide. Tier II values for amenable and available cyanide were not developed. CTI completed an evaluation of the MDEQ Remediation Redevelopment Division (RRD) Cyanide Information Sheet, dated October 22, 2004. The Information Sheet indicated that when total cyanide concentrations exceed the Generic Cleanup Criteria, available cyanide analysis should be performed. As a result, beginning with the Annual "spring-Time" 2008 sampling event, JCI added available cyanide analysis at the two monitoring well locations (MW-24 and MW-J2) with the highest observed total cyanide concentrations. Prior to this analysis modification, only total cyanide analysis was being performed and the total cyanide concentrations were being compared to the FAV and Reported Worst Case Maximum Values for free cyanide. Currently, the available cyanide concentrations at MW's-24 and-J2 are compared to the free cyanide criterion to determine compliance.

The current total cyanide concentrations for MW-24 and MW-J2 are 73 µg/L and 62 µg/L, respectively. Over the three reporting cycles, total cyanide at MW-24 ranged from 48 µg/L to 73 µg/L, and total cyanide at MW-J2 ranged from 45 µg/L to 68 µg/L. Available cyanide results for the first two events were below the free cyanide criterion. The current available cyanide concentrations for MW-24 and MW-J2 are 3 µg/L and 2U ("U" indicates no reported detection), respectively (Appendix B) are below the free cyanide criterion.

Total copper (36 µg/L) at the MW-28C location exceeded the MDEQ's Generic GSI Criterion of 29 µg/L. However, the dissolved copper concentration at the same location (0.33 J µg/L) remains below the MDEQ FAV and Worst Case Concentration Maximum. CTI reviewed the field notes taken on the day of sample collection and it appeared that not only was the well not recharging adequately, but there may have been an issue with the turbidity measurements. Turbidity is the likely factor that led to the wide margin between the total



and the dissolved concentrations. It should be noted this well is located off-site, up-gradient and is a background well.

In accordance with the approved planning documents for the GMPP, total and dissolved mercury analyses were performed. The MDEQ Mixing Zone Letter does not contain FAV or Worst Case Maximum Values for the two analytical methods. Therefore, the published Generic GSI Criterion for methyl mercury (0.0013 µg/L) was used. Speciation of mercury may be required in the future to determine the concentration of methyl mercury. Table 2 documents the analytical results for total and dissolved mercury.

### **VOC Results Summary**

As with the inorganic data presented above, the groundwater VOC analytical results were compared to the MDEQ Mixing Zone FAVs, Worst Case Maximum Site Concentration Values, and to the MDEQ Generic GSI Cleanup Criteria. Table 3 is a tabular summary of the VOC concentrations.

Trichloroethene (TCE) was below the FAV value of 3,500 µg/L at all GSI compliance wells. The highest reported TCE concentration occurred at MW-02 (4,500 µg/L), which is located up-gradient and along the eastern property boundary. Monitoring well MW-02 is not a GSI compliance well. The MW-02 TCE concentration for this reporting cycle exceeded the Worst Case Maximum Value of 4,200 µg/L.

It is important to note, while MW-2 is a part of the GMPP, it is not identified as a GSI Compliance well. The current TCE concentration is just 10% of the Worst Case Maximum Value. Historically, TCE concentrations have been high at this location; however, this specific Semi-Annual sampling event was completed in November, which revealed a lower water table (by one foot or more) at many well locations. The elevated concentration may be a result of seasonal groundwater variation. It should also be noted, the analytical results for the compliance wells down-gradient (between MW-02 and the river) have not revealed TCE with concentrations that exceed the MDEQ compliance values.

The current analytical result for cis-1,2-dichloroethene (cis-1,2-DCE) at well MW-02 is 1,300 µg/L. The result for this reporting cycle exceeded the MDEQ Worst Case Maximum Value of 910 µg/L. The MDEQ did not issue a Mixing Zone FAV for cis-1,2-DCE. The MDEQ identified cis-1,2-DCE with an "nr" indicating that there was no reasonable potential for the compound to exceed water quality standards. The only noted exceedence for the cis-1,2-DCE compound was at MW-02.

The reported concentrations of vinyl chloride at wells MW-17 and MW-B1 are 41 µg/L and 47 µg/L, respectively. Vinyl chloride concentrations remain below the MDEQ calculated Worst Case Maximum Value of 110 µg/L. These two well locations are located near the southwest corner of the site, north of the railroad tracks and along the Red Cedar River. With the exception of MW-17 and MW-B1, no other Generic GSI Criterion exceedences were reported for this compound. The MDEQ did not issue a Mixing Zone FAV for vinyl chloride. The MDEQ identified vinyl chloride with an "nr" indicating that there was no reasonable potential for the compound to exceed water quality standards.

#### **MNA Results Summary**

In accordance with the approved planning documents for the GMPP, a monitored natural attenuation (MNA) evaluation was not completed during this cycle; however, the results from this event are posted in Table 4, *Monitored Natural Attenuation Parameters*.

#### **6.0 QUALITY ASSURANCE QUALITY CONTROL**

The complete laboratory quality control report generated for groundwater samples collected is presented in Appendix B, which indicates the data are valid and acceptable for use. The laboratory-derived Spike Percentage Recoveries for the metal and VOC quality control (QC) batches appear to be within the laboratory-derived Control Limits. Analytical results for trip samples and blank samples are also presented in Appendix B. One duplicate sample was analyzed during this sampling event cycle. The analytical results for the duplicate pairs are listed as samples MW-28 and DUP-01 on the laboratory reports (Appendix B). Table 5 contains the analytical results for the duplicate pairs and a calculated relative percent

difference (RPD) between the samples and their respective duplicates. The RPD was calculated using the following formula:

$$RPD = \frac{|A - B|}{(A + B)} \times 200$$

Where,

A = concentration value reported for original monitoring well sample

B = concentration value reported for duplicate sample.

In general, when an RPD value is greater than 20 percent it may be evidence the duplicate sample is statistically different than the original sample. Evaluation of the VOC and dissolved metals duplicate analyses indicated the relative percent difference between the sample sets was within acceptable limits for all analyzed constituents, with the exception of dissolved selenium. The RPD exceedence for selenium is due to the extremely low concentration values in the sample set.

## 7.0 CONCLUSIONS

The objectives for this sampling cycle have been met. Fifty-two (52) on-site and off-site wells were accessed for water level measurements, and 17 viable GMPP wells were sampled and analyzed in accordance with the CMIP.

The groundwater flow characteristics remain consistent with the findings from previous events. Shallow groundwater across the site flows to the Red Cedar River.

The MW-24 and -J2 locations exhibit the highest total cyanide concentrations at the site. Over the three reporting cycles, total cyanide at MW-24 ranged from 48 µg/L to 73 µg/L, and from 45 µg/L to 68 µg/L at MW-J2. Available cyanide results for the first two events were below the free cyanide criterion. The current available cyanide concentrations for MW-24 and MW-J2 are 3 µg/L and 2U ("U" indicates no reported detection), respectively (Appendix B) are below the free cyanide criterion. The observed relationship between total and available cyanide is extrapolated for the MW-17 and -26 locations, where total cyanide

was also detected. Based on these observations, cyanide at the site does not exceed free cyanide criterion.

Turbidity appears to have caused the observed total concentration of copper at background well MW-28C, 36 µg/L. The dissolved sample from the same location was 0.33 µg/L. Monitoring well MW-28C is not a GSI compliance well and copper at the site does not exceed criterion.

The MDEQ Mixing Zone Letter does not contain FAV or Worst Case Maximum Values for mercury. Therefore, the published Generic GSI Criterion for methyl mercury (0.0013 µg/L) was used. Speciation of mercury may be required in the future to determine the concentration of methyl mercury.

Trichloroethene (TCE) was below the FAV value of 3,500 µg/L at all GSI compliance wells. The MW-02 TCE concentration for this reporting cycle exceeded the Worst Case Maximum Value of 4,200 µg/L. Historically, TCE concentrations have been high at the MW-02 location. This Semi-Annual sampling event was the first event completed in November. Seasonal fluctuation in observed TCE concentration at the well, as well as a lower water table (by one foot or more) at many well locations, may have influenced the reported value. It should also be noted, the analytical results for all GSI compliance wells down-gradient (between MW-02 and the river) have not revealed TCE concentrations that exceed the MDEQ compliance values. It is concluded that TCE levels do not exceed criterion, and further action is not warranted at this time. Monitoring well MW-25, the first GSI compliance well located downgradient of MW-02, will be replaced during the 2009 well abandonment and replacement efforts. Its availability will assist with down-gradient monitoring in accordance with the CMIP.

Vinyl chloride concentrations at MW's-17 and -B1 remain below the MDEQ calculated Worst Case Maximum Value of 110 µg/L. With the exception of MW-17 and MW-B1, no other Generic GSI Criterion exceedences were reported for this compound. The MDEQ did not issue a Mixing Zone FAV for vinyl chloride. The MDEQ identified vinyl chloride with an "nr"

indicating that there was no reasonable potential for the compound to exceed water quality standards. Based on these observations, vinyl chloride does not appear to be an issue, and further action is not required at this time.

